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FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF THE SECRETARY

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of	)	
	)	
Amendment of the Commission's Rules	)	ET Docket No. 98-237
With Regard to the 3650-3700 MHz	)	RM-9411
Government Transfer Band	)	
	)	
The 4.9 GHz Band Transferred from	)	WT Docket No. 00-32
Federal Government Use	)	

COMMENTS OF INMARSAT LTD.

Inmarsat Ltd. ("Inmarsat"), by counsel and pursuant to Section 1.415 of the Commission's rules, hereby submits its comments in response to the Second Notice of Proposed Rulemaking ("Second Notice") in the above-captioned proceeding.[1] Inmarsat is purchasing three Inmarsat-4 satellites equipped with feeder links in the band 3550-3700 MHz, at least one of which will provide services to the United States, and is therefore directly affected by this proceeding.

In the First Report and Order in this proceeding, the Commission reallocated the 3650-3700 MHz band to Fixed and Mobile (base stations) terrestrial service ("FS" and "MS") on a primary basis. Both licensed Fixed Satellite Service ("FSS") earth stations in the band and applications for earth stations that were filed no later than November 30, 2000, received grandfathered co-primary status. New FSS earth stations in the band will be required to operate on a secondary basis. Inmarsat is, concurrent with these

comments, filing a petition for reconsideration of the Commission's decision to relegate FSS operations in the band to secondary status relative to FS and MS.

In the Second Notice, the Commission seeks comment on a number of application and licensing rules, as well as technical parameters for FS and MS operations in the 3650-3700 MHz band. Inmarsat herein responds to those portions of the Commission's inquiry pertaining to technical proposals governing the coordination of FSS with FS and MS services.

1. Coordination Distance Calculation

The Commission has determined that coordination procedures, as opposed to FS power restrictions, are the best means by which to protect grandfathered FSS sites from harmful interference caused by FS operations. In the Second Notice, the Commission seeks comments on its proposal to maintain a coordination distance cut-off of 200 km.[2] For earth stations located within this distance from an FS or MS site, terrain factors would be taken into account in siting the FS or MS stations. In addition, pursuant to the suggestion of Comsearch, the Commission proposes the use of the over-the-horizon propagation calculations in Appendix S7 of the ITU Radio Regulations as part of the coordination formula.

Inmarsat generally supports a 200 km coordination distance. However, Inmarsat also believes that the proposal, as set forth in the Second Notice, does not contain sufficient technical details of the FS and MS transmitters involved to permit a complete

[1] Amendment of the Commission's Rules with Respect to the 3650-3700 MHz Government Transfer Band, ET Docket No. 98-237, First Report and Order and Second Notice of Proposed Rulemaking, FCC 00-363, released October 24, 2000.

assessment of the required separation distances that Appendix S7 calculations would yield. While Inmarsat agrees that a coordination distance of 200 km should be acceptable in most directions around an earth station, Inmarsat also believes that this distance should be somewhat greater within a narrow azimuthal range around the boresight direction, that is, the direction in which the earth station antenna is oriented. Annex A provides an estimate of the coordination distance in the boresight direction, using the values of Appendix S7, except for the FS e.i.r.p. level, for which Inmarsat employs the figure given in Paragraph 101 of the Second Notice. Based on this, Inmarsat suggests a boresight directional coordination distance of 400 km. However, Inmarsat notes that the coordination cut-off is only a first-cut method of identifying sites that must be analyzed, and that often times FS and FSS operations can exist much closer to each other. The Commission must be careful not to characterize these coordination distances as establishing "exclusion zones" around the earth station facilities.

2. Deletion of Footnote US 245

The Commission has specifically requested views on the deletion or modification of footnote US 245, which restricts the use of the FSS allocation to "international inter-continental systems subject to a case-by-case electromagnetic compatibility analysis." [3] Inmarsat has no objection to removal of the footnote, in view of the ameliorating effects that this could have on overall spectrum congestion in the C-band. However, Inmarsat believes that such action will produce only minimal benefit if the Commission affirms its decision to relegate FSS operations in the band to secondary status, since FSS operators

[2] Second Notice at ¶ 103.
[3] Second Notice at ¶ 128.

will have little incentive to use the band. If the Commission truly seeks to foster "flexible and efficient use of FSS earth station sites" as stated in the Second Notice, it should combine elimination of the footnote with the return of FSS operations in the band to co-primary status, as urged by Inmarsat in its petition for reconsideration of the First Report and Order in this proceeding.

3. Power Flux Density Limits

Finally, the Commission requests comments on limits for the power flux density that a space station operating in the band 3650-3700 MHz may produce.[4] Inmarsat suggests that the limit in the ITU Radio Regulations S21.16 should be applied. This limit is applied throughout the 3400-4200 MHz band on a global basis, where FSS and FS operations commonly share co-primary status. Applying this same standard in the 3650-3700 MHz band will allow for uniformity of regulation applicable to international service providers.

4. Conclusion

Inmarsat supports the Commission's efforts to incorporate flexibility into the coordination process between FSS and FS operations in the 3650-3700 MHz band. Such flexibility will encourage the development of both technologies, thereby benefiting both

[4] Second Notice at ¶ 133.

operators and end users. Therefore, Inmarsat urges the Commission to adopt the suggestions made by Inmarsat herein.

Respectfully submitted,

INMARSAT LTD.

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ANNEX A

Calculation of the Coordination Area using Appendix S7 of the Radio Regulations

Appendix S7 of the Radio Regulations provides a method for the determination of the coordination area around an earth station. The coordination area is determined by calculating the minimum permissible transmission loss L(p) for p% of the time. The Appendix provides a means of calculating the attenuation caused by two different mechanisms: propagation mode (1) which is the tropospheric propagation loss via a near-great circle path, and propagation mode (2) which is attenuation subject to rain scatter due hydrometers;

For propagation mode (1) the minimum transmission loss is expressed by:

$$L_b(p) = P_{t'} + G_{t'} + G_r - P_r(p) \quad \text{.....(dB)}$$

where:

$L_b(p)$: minimum permissible transmission loss, propagation mode (1)

$P_{t'}$: maximum available transmitting power level (dBW)

$G_{t'}$: gain (dB relative to isotropic) of the transmitting antenna

G_r : gain (dB relative to isotropic) of the receiving antenna

$P_r(p)$: permissible level of an interfering emission (dBW)

Based on the parameters given in Appendix S7 and the FCC Report and Order & NPRM, the following value of L(p) was found.

$P_{t'}+G_{t'}$ = 10 log (1640) = 32.2 dBW (assumed max. fixed station eirp = 1640 watts, FCC R&O and NPRM § 101)

$P_r(p)$ = 10 log (kT_eB) + J + M(p) –W

= - 228.6 + 20 + 60 + 0 + 5 – 0 (using the parameters given in Table II of App. S7)

= -143.6 dBW

Therefore,

$L_b(p)$ = 32.2 + 0 - (-143.6)
= 175.6 dB

assuming $G_r = 0$ dBi (receive earth station antenna gain at an elevation angle to the horizon of 14.5 degrees)

Assuming $A_h \approx 15$ dB (for a horizon elevation angle of 0.5 deg.) from Figure 1 of Appendix S7)

$$L_b(p) - A_h = 175.6 + 15 = 160.6 \text{ dB}$$

Using a correction factor (p = 0.001 % of the time) of 1.16 for Zone A, and 1.6 for Zones B and C the resulting coordination distances for propagation mode (1) are;
(Zone A) ≅ 197 km,
(Zone B) = 1000 km (maximum coordination distance for Zone B)
(Zone C) ≅ 1100 km.

For propagation mode (2), rain scatter, the normalized transmission loss was found to be:

$L_2(0.01) = 179.6$ (dB) ..... (reference §4 of Appendix S7)

The above required transmission loss for propagation mode (2) would result in a rain scatter distance of over 600 km for all of the five rain climatic zones given in Appendix S7. However, based on Table V of Appendix S7, for p = 0.001% the following maximum rain scatter distances would apply; 540 km for rain-climatic zone 1, 470 km for rain climatic zone 2, and 390 km for rain climatic zones 3, 4 and 5.

CERTIFICATE OF SERVICE

I, Maria Cabico, do hereby certify that copies of the foregoing pleading was served via hand delivery on this 18th day of December, 2000, to the following:

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